

[In the copy of the 'Fauna of Turkestan' translated by me, I find the following short list of addenda, by Dr. N. A. Severtzoff.—F. C. C.]

MAMMALIA.

1. *Felis (Catolynx) chaus* (vel *Chaus catolynx*, Pall.).

Occurs about Semiretchje, Issik-kul, about Hodgents, and in the whole Zarevshan valley, Lower-Oxus marshes. It has considerably larger feet than *F. servalina*.

2. *Canis aureus*.

On the Oxus.

3. *Vesperugo noctula*.

At Cheenaz on the Syr it was caught in March 1875; not observed before.

4. *Spermophilus xanthoprymnus*, Benn.

Erroneously noticed by me formerly as *Sp. fulvus*, Licht., which also exists in Turkestan, but only near the lower Syr. *Sp. xanthoprymnus* was found by me near Tashkent and Cheenaz, and near Samarkand by Russoff.

5. *Spermophilus Eversmanni*, Brdt.

Found, in the summer of 1874, near the mountain-lake Lairam-kul, north of Kulja.

XXXVII.—*Descriptions and Figures of Deep-Sea Sponges and their Spicules, from the Atlantic Ocean, dredged up on board H.M.S. 'Porcupine,' chiefly in 1869 (concluded).* By H. J. CARTER, F.R.S. &c.

[Continued from p. 324.]

Cometella pyrula, n. sp. (Pl. XIV. fig. 20, and Pl. XV. fig. 38.)

General form pear-like, twisted upon itself or towards the stem, which is attached to a small stone; head pyriform, apiculated by the projection of a conical point (Pl. XIV. fig. 20, *f*). Colour cream-yellow. Surface smooth, hard, firm, punctate, each punctum being the apex of a low conical projection formed of spicules arranged in a whorl-like manner (fig. 20, *h*). Pores not seen, probably the puncta respectively

(fig. 20, *g*). Vent single, apical, surrounded by a cone of long linear spicules (fig. 20, *e*). Internal structure densely spiculous, compact, suberose, hard and firmly continuous with the dermal layer; composed of spicules radiating in bundles from the centre (which is light-coloured, on account of the comparative absence of sarcode) to the circumference; followed by a zone of softer substance, in which the ova appear to be specially developed, limited by a layer of compressed cavities, forming part of the excretory canal-system, into which the ova fall probably, when matured, and thus gain their exit. This, again, is followed by a subdermal zone, in which the bundles of spicules appear to be finally divided into lashes, each lash going to a punctum or pore on the surface; last of all comes the dermal zone itself, which is composed of a layer of spicules corresponding in the lightness of its colour with that of the centre, probably also from the comparative absence of sarcode; the whole traversed by the excretory canal-system, which opens at the single vent mentioned (fig. 20, *d*). Stem similarly composed. Sarcode of the internal substance yellower than that of the dermis. Spicules of two kinds, viz. skeleton- and flesh-spicules. Skeleton-spicules of two forms, viz. :—1, large, acerate, fusiform, smooth, finely pointed at each end and nearly straight, about 37- by $\frac{1}{2}$ -1800th inch (Pl. XIV. fig. 20, *i*, and Pl. XV. fig. 38); 2, small or sub-skeleton, short, subacuate or subacerate, fusiform, slightly curved, thickly and irregularly spined, spines short, sharp, conical, vertical, 11- by 1-1800th inch (fig. 20, *k*). Flesh-spicule of one form only, viz. equianchorate, with slightly curved bow-shaped shaft and falcate spreading arms, webbed up nearly to the points (fig. 20, *l, m*). The skeleton-, mixed with a few of the spinous spicules, chiefly make up the structure of the sponge generally, while the cone at the apex of the head (fig. 20, *f*) is formed by a projection of the smooth long acerates alone; each "lash" of spicules also, after traversing the subdermal zone, ends by slightly protruding beyond the apex of its respective punctum, while the dermal layer of the short spiniferous acuates is arranged in whorls round the puncta, whose apices are thus traversed by the lash of skeleton-spicules respectively; and here *alone* the flesh-spicules (anchors) appear to be congregated. Size of specimen about 11-24ths inch long by 4-24ths in the broadest part, *i. e.* of the head.

Hab. Marine, attached to small pebbles.

Loc. Atlantic Ocean, in 290 fathoms, about 65 miles N.N.W. of the Orkneys.

Obs. There is but one *entire* specimen of this little sponge,

accompanied by the stem of another, from which the head has been broken off. The label on the jar is "78," which gives the locality and depth above mentioned. It appears to belong to Schmidt's genus "*Cometella*" ('Atlantisch. Spongienf.' 1870, p. 49), and under other circumstances might grow erect and have a longer stem, as the headless one (fig. 20, c) seems to point out. The spicules indicate an alliance with those of the group *Halichondrina*, while the compactness of the tissue is like that of the Suberite *Halichondria suberea*, &c. In the jar with it are specimens of *Halichondria carnosae*, *Polymastia*, *Hymeraphia verticillata*, *Phakellia ventilabrum*, and *Tethya cranium* = *Donatia*, Gray.

Hymeraphia microcionides, n. sp. (Not illustrated.)

General aspect laminiform, extremely thin, following horizontally the form of the surface on which it may be growing. Colour now light yellow. Surface hirsute from the projection of long smooth spicules. Pores and vents indistinct. Internal structure consisting of a layer of spined spicules confusedly arranged, out of which spring vertically others which give the hirsute character just mentioned. Spicules of two kinds, viz. skeleton- and flesh-spicules. Skeleton-spicule of three forms, viz.:—1, large, long, acuminate, smooth, nearly straight, attenuatingly pointed, increasing in size gradually from the large or fixed to the small or free end, 100- by $1\frac{1}{2}$ -1800th inch; 2, subskeleton, much smaller than the foregoing, acuminate, short-spined, attenuatingly pointed, slightly curved towards the fixed end, which is a little smaller than that of the shaft that follows it, 16- by 1-1800th inch; 3, subskeleton, cylindrical, circularly curved (that is rainbow-like), spined throughout, especially at the ends, which are obtuse and round, 10- by $\frac{1}{2}$ -1800th inch. Flesh-spicule of one form only, viz. equianchorate, small, navicular in form, rather bent in the shaft, 6-6000ths inch long. The curved, cylindrical, spined spicule forms a dense layer in which the two acuates are fixed vertically by their large ends, the spined acuminate only just appearing above the surface, while the large smooth one is 1-12th inch long, and the flesh-spicule, or anchorate, scattered irregularly throughout the lamina. Size of specimen about $\frac{3}{4}$ inch in diameter, and 1-96th inch thick, exclusive of the long spicules.

Hab. Marine, on hard objects.

Loc. Station 25, in 374 fathoms, near Cape St. Vincent, growing over a piece of *Pachastrella abyssi*.

Obs. There is nothing peculiar in this sponge beyond its resemblance to *Microciona* in its growth, form, and spicules.

In *Microciona*, however, the arrangement of the latter is for the most part scopiform, or in vertical bundles (hence Schmidt's name "*Scopalina*"); while here there is a distinct layer formed by the curved spinous spicules, out of which the acuates project separately and directly upwards like hairs on the surface of the body. The equianchorate is like that of *Microciona*; and most probably both it and *Hymenophria* will hereafter be shown to be intimately allied.

Since this was written, Mr. T. Higgin has sent me a specimen of a like sponge, which he found on a piece of old stony coral from Grenada, in the West Indies. It is lamini-form, extremely thin, and consists of a layer of spiniferous spicules, out of which project a number of smooth long acuates hirsutely. But the bedding spined spicules are *quadriradiate*, somewhat like in form to those of *Dercitus niger*; and I could detect no kind of flesh-spicule.

Suberites massa, Sdt. (Spong. Adriat. Meeres, p. 67,
Taf. vii. fig. 2).

Two fragments of this sponge were dredged up at station 65 in 345 fathoms. They consist of small round branches about 2 inches long, which are again branched irregularly and more or less coalescent. Indeed they look as if they had been torn off from some larger coalescent mass of vertical branches of the same nature. The colour is light yellow, the surface villous, the structure compact, and the spicule of one kind only, viz. pin-like, with smooth, fusiform, pointed shaft and more or less oval head.

The tendency of this sponge is evidently to coalesce, so that, in its lower or older part, it becomes massive, as seen in the specimen illustrated by Schmidt, where the tops of the branches only remain free. A similar specimen exists in the British Museum, where it is even more consolidated—and another where the branches have remained more separate and terminate in flattened digitate or serrate margins respectively, like toes on the human foot. These came from the coast of Portugal. I have also a specimen of the kind from the Mauritius, sent to me by Dr. Dickie, of a pinkish yellow colour.

Another in the British-Museum collection was dredged up by Sir J. Ross in $74\frac{1}{2}^{\circ}$ south latitude, depth 206 fathoms; but it is of a leaden grey colour, and possessing a pin-like spicule, in which the head is for the most part spherical and much larger than any other part of the spicule, I have proposed for this (in MS.) the name of "*Suberites antarctica*." In its sur-

face are nestled parasitically many small crustaceans, which have been named, described, and figured by the Rev. Thomas R. R. Stebbing, M.A. ('Annals,' 1875, vol. xv. p. 184, pl. xv. fig. 1, &c.).

POLYMASTINA.

(μαστός, nipple.)

I would propose this name for a group of sponges which provisionally might be placed before *Donatina*, in the suborder Suberitida, under the order Holorhaphidota in my classification ('Ann.' 1875, vol. xvi. p. 190), characterizing it by a smooth appendiculate (mastophorous) surface, for the most part sessile, sometimes stalked; composed internally of a radiating structure consisting of bundles of large, smooth pointed, fusiform spicules, for the most part round or inflated pin-like at the inner or larger end, sometimes acerate or sharp at both ends; faced with a smaller spicule of the like form, which, together with the larger ones, project more or less beyond the surface, so as to give it the villous character above mentioned. More or less hollow or soft internally, or intensely compact and hard throughout.

Of these, *Polymastia brevis*, *bulbosa*, *mamillaris*, *ornata*, and *robusta*, Bk. (*op. cit.* vol. iii. 1874), also *Thecophora semi-suberites*, Sdt., *T. ibla*, Wy. Thomson, *Rinalda uberrima*, Sdt., with the, to me, stalked forms, viz. *Polymastia stipitata*, n. sp., *Cometella simplex*, n. sp., and *Podospongia Lovenii*, Bocage, together with the laminiform *Latrunculia cratera*, Bocage, have all, with the exception of *Cometella simplex*, which seems to have come from the "chops" of the English Channel, been dredged up at various stations respectively between the north of Scotland and the Färöe Islands, especially at station 65, in 345 fathoms.

Other species of *Polymastia* have been described and illustrated by Dr. Bowerbank (*op. cit.*), viz. *P. conifera*, *radiosa*, and *spinularia*, also by Schmidt (Atlantisch. Spongienf. 1870), viz. *Radiella spinularia*, Sol., *Eumatia sitiens* and the stalked sponge *Cometella stellata* perhaps; while Balsamo-Crivelli in 1863 (Atti della Soc. Ital. di Scienze, vol. v. tav. vi. figs. 10-17) first of all figured the species *Suberites appendiculatus*. It is possible that several of these species are but different forms of the same; hence further observations may considerably reduce their number.

The second kind of sponges included under Polymastina is the hard, solid, compact one, but still presenting the same kind of spicules and villous surface. One of these I described and illustrated in 1870 under the name of *Trachya pernucleata*

('Ann.' 1870, vol. vi. p. 178, pl. xiii. figs. 11, &c.), also establishing the genus at the same time.

Others of a like nature exist in the British Museum from Port Elizabeth in S. Africa; and lately Mr. W. J. Sollas has given me half of one, in form like a little bolster (viz. cylindrical and slightly constricted in the middle), said to have come from Australia. It is 5 inches long and 2 inches thick. Those which I have hitherto seen vary under this size, are more or less globular, and each attached to a little stone. They are *intensely* hard and tough, grey outside and light yellow within, presenting a uniformly round form and stiff villous surface, with no appearance of vents, or at least, if any of the latter, very small, numerous, and indistinct. Internally the structure is fibrous, radio-reticulate, traversed through the interstices by the excretory canal-system, which is evident enough here. As the branched reticulation radiates from the centre, which is *not* nucleated, the fibre of which it is composed becomes smaller and the interstices closer until a little before it arrives at the circumference, where it is lost in a dense mass of spicules that terminate in the villous surface of the dermis. The spicules of which the reticulated structure and the body generally are composed are smooth, slightly curved, and fusiform, rounded or inflated pin-like at one end and more or less pointed at the other, faced by a smaller but like form at the circumference, where there is *no cortex* beyond the more densely packed state of the general structure. My observations under *Trachya pernucleata* (*l. c.*) are equally applicable here; and these sponges, of which there may be several species, will probably have to be considered a solid *Geodia*-like form of *Polymastia*, very nearly allied to the *Donatina*, and all belonging to the suborder Suberitida. I am very much inclined to think that although in some of the species the spicule appears to be acerate (that is, finely pointed at *both* ends), a microscopical power of about 400 would show that one end is slightly obtuse—that is, leading to the acute and pin-like forms with fusiform shafts of most of the species. When one end of a linear spicule is rendered thus obtuse, it is always at the expense *in length* of this half of the spicule, so that the maximum inflation of the shaft is thus thrown out of the middle and nearest to the obtuse end.

Polymastia stipitata, n. sp.

General form consisting of a head and long stem. Head round at first, then obovoid with a papillary eminence on one side of the large end; afterwards cylindrical, expanded upwards,

truncate obliquely above and horizontally below, the truncated areas being circumscribed by a prominent ridge, which above, when fully developed, rises into a circular wall that terminates the head. Stem long, slender, expanded at first where in connexion with the head, then narrow, and afterwards gradually increasing towards the lower end, where it suddenly thickens into an irregularly bulbous form, to terminate in a bunch of numerous root-like fibres more or less matted together with the sand in which the sponge has been fixed. Colour grey. Surface hirsute throughout, hirsuteness especially evident over the head and ridges formed by the pointed ends of projecting spicules, which, taking a spiral direction round the body, end in a whorl for the most part situated in the centre of the summit; stem rugose or corrugated circularly on the surface, where the rugæ are most prominent at the lower part. Pores not seen. Vents on the summit and upper part of the head respectively, consisting of a large one in the centre of the whorl, and one to five smaller ones along the projecting line formed by the upper ridge, each vent prolonged by a little conical tuft of spicules. Internal structure radiate, consisting of bundles of large spicules imbedded in sarcode and issuing in gyrate lines from a central point towards the circumference, where their points intermingle with those of a dermal layer of small spicules, which thus together produce the hirsute surface; traversed by the branches of the excretory canal-systems which terminate at the vents mentioned. Stem internally consisting of a gently spiral cord formed of large long spicules applied longitudinally to each other successively, where they are all held together by sarcode, and covered by a dense dermal layer or sheath, through which the dermal spicules project perpendicularly in the form of a minute crust. Spicules of one form only and two sizes, viz. a body- and a dermal-spicule. Body-spicule large, long, acerate, fusiform, attenuatingly pointed at both ends, one of which is *slightly* obtuse, nearly straight, 250- by 4-1800ths inch. Dermal spicule of the same form, but only a 40th part of the length, being 6-8- by $\frac{1}{3}$ -1800th inch. The body-spicule chiefly belongs to the stem and bundles of the head, each of which is faced by the layer of dermal spicules, while an intermediate size filling up the interstices of the head causes the hirsute character there to be more evident than on the stem, where the dermal spicule alone exists.

Size. This, like the form, depends upon age and the degree of development. The largest I have is about $3\frac{1}{2}$ inches long, $\frac{1}{2}$ an inch of which is head and the rest stem; the head is about $\frac{1}{12}$ inch in diameter at its upper part.

Hab. Marine, growing erect in a sandy bottom, in which the root-like fibres are spread out for fixation.

Loc. Chiefly between the north of Scotland and the Färöe Islands.

Obs. The above description shows that the structure of the head is essentially like that of the sessile *Polymastia*, Bk.; hence its designation; while the lower end of the stem, being suddenly enlarged and terminating in a bunch of numerous rootlets, contrasts strongly with the following species, which is the reverse, although the structure of the head here too will be seen to resemble that of *Polymastia*. At first I thought *Polymastia stipitata* was Sars's *Hyalonema longissimum*, since some of the specimens of the former (which came from near Cape St. Vincent) are exactly like his figures: but there is no central inflation of the spicule in any of them; and if there were, there would be no sexradiate cross of the central canal, which is peculiarly, as Schmidt has noticed, the character of the Hexactinellida: therefore I wonder that the name of "*Hyalonema*" should have been applied to these sponges; a glass stem alone does not make a hexactinellid sponge. The same might be said of Lovén's *H. boreale* (figs. 9-11, 'Ann.' 1868, vol. ii. p. 81, pl. vi.); while Prof. Wy. Thomson ('Depths of the Sea,' p. 114) only gives a figure of the entire sponge without alluding to the form of the spicules. Still the forms represented by Lovén's, Sars's, and Thomson's figures respectively of the entire sponge are all present among those dredged up on board the 'Porcupine,' none of which have any central inflation on the spicule: or if so, it must be the exception; for after repeated examinations I have not found one.

Cometella simplex, n. sp. (Pl. XVI. fig. 53.)

General form consisting of a head and stem. Head obovate globular, passing below into a fine stalk, which, narrowing towards the lower end, divides dichotomously into a few delicate, dendriform, root-like fibres. Colour light yellow. Surface of head and stem hirsute throughout, hirsuteness especially prominent over the former, arising from the projection of the pointed ends of the spicules. Pores and vents not evident. Internal structure radiate, consisting of bundles of large spicules extending from a central point to the circumference, where they are met by a much smaller set, which together produce the hirsute appearance; head in a longitudinal section presenting a thin transparent dermal layer, then an opaque much thicker subdermal zone, followed by a layer of compressed cavities, which belong to the excretory canal-system, finally

resting on the radiating structure of the centre (see section of *Cometella pyrula*, Pl. XIV. fig. 20, *d*). Stem internally consisting of large spicules applied longitudinally to each other successively as they are held together by sarcode, and finally covered by a denser dermal sheath, pierced perpendicularly by smaller spicules. Spicules of three forms, viz. acuate, sub-pinlike, and pinlike or dermal, all smooth, nearly straight, fusiform, and attenuatingly pointed. The largest or acuate has the large end rounded and a little less in diameter than the shaft, 150- by $\frac{3}{4}$ -1800th inch; the smallest or dermal is pinlike, with globular terminal inflation, also a little less in diameter than the shaft, 20- by $\frac{1}{2}$ -1800th inch; and the sub-pinlike of intermediate size between the two, with the terminal inflation equally variable, as the globular head appears to pass gradually into the simple, round, acuate or uninflated end of the large skeleton-spicule. The largest spicules are confined to the stem and the bundles in the head, both of which are faced by a layer of the pinlike dermal spicule, mixed with the intermediate sub-pinlike ones, not only in the head but throughout the stem. Size of specimen (for there is only one) $\frac{5}{12}$ inch long in totality, of which $\frac{2}{12}$ belong to the head.

Hab. Marine, growing erect, fixed in a sandy bottom by the root-like fibres above mentioned.

Loc. Probably the "chops" of the English Channel in about 500 fathoms.

Obs. Although there is no number on the jar containing this specimen, its concomitants seem to indicate the locality just mentioned. By a comparison with the foregoing species, viz. *Polymastia stipitata*, the points of difference will be obvious, although the structure of the head together with the forms and disposition of the spicules respectively closely allies it to the *Polymastia*. The specimen is very small; and therefore its fully developed form may be somewhat different, as in the last species. Being like Schmidt's genus *Cometella* in figure and constitution, I have given it his generic name, with the specific designation of "*simplex*," as it contains no flesh-spicule like that of *C. stellata*, Sdt.

Podospongia Lovenii and *Latrunculia cratera*, Boc.

Specimens of these two sponges, so well described and illustrated by Bocage (Journ. d. Sc. Math. Phys. et Naturelles, no. iv. Lisbonne, 1869), were dredged up between the north of Scotland and the Färöe Islands, and the former also at two or three other stations between this and the coast of Portugal. Between Scotland and the Färöe Islands, the former came

from station 82=312 fathoms, and the latter from 65=345 fathoms.

Although *Podospongia Lovenii* is furnished with a long stem like *Cometella*, and *Latrunculia cratera* is laminiform, incrusting, there is so little difference between the shape and disposition of their spicules, that I cannot help thinking that both ought to have been put under the same generic name.

Again, while Schmidt places his genus *Cometella* among his Suberitidinæ, he places *Latrunculia cratera* under his Desmacidinæ. But if *Podospongia* and *Latrunculia* be but species of the same genus, as I have above assumed, and the structure of *Cometella*, especially *C. stellata*, Sdt., be closely allied to that of *Podospongia Lovenii* (which is the case), then it appears to me that all these should come under the Suberites, where Schmidt has placed his *Cometella*, if not Schmidt's laminiform *Sceptrella regalis* also, whose body- or linear spicule, according to the type specimen in the British Museum, is like that of the rest, viz. acuate, smooth, fusiform, while the sceptre-like flesh-spicule only differs from that of *Latrunculia* in the presence of spines over its rays and of three forms of the anchorate, which "forms," as Schmidt has observed (Atlant. Spongienf. p. 58), are certainly very remarkable; but still they are but flesh-spicules, the value of which in specific distinction is, as I have before stated, not always of much consequence.

Geodia nodastrella, n. sp. (Pl. XVI. fig. 45.)

General form irregularly tuberous (like a potato) when large, spheroidal when small; free or fixed, presenting one or more points of attachment according to the circumstances and situation under which it has grown, with here and there large, deep depressions of the surface. Colour yellowish opaque white. Surface even, presenting here and there the deep depressions mentioned, bottomed by a cribriform structure. Dermis consisting of a reticulated layer of sarcode charged with minute nodastrelloids (Pl. XVI. fig. 45, *g, k*); stelliferous in appearance, on account of the interstices being most developed in patches linked together by the general reticulation; supported on bundles of small, dermal, acerate spicules that project from the subjacent petrous crust (fig. 45, *h*), which consists of an agglomeration of siliceous balls, held together by sarcode charged with nodastrelloids, and pierced by numerous holes (which respectively are overlaid with the stelliform patches of the dermal reticulation just mentioned) opening internally into the great marginal cavities of the pore-system. Pores consisting of the interstices of the dermal reticulation, opening

into the lobes respectively of the petrous crust. Vents in the cribriform structure at the bottom of the deep depressions of the surface. Internal structure consisting of a circumferential zone of spicules arranged parallel to each other and perpendicular to the body-substance on which their pointed ends rest, while their heads support the petrous crust of siliceous balls; composed of the "zone-spicule" *par excellence* (fig. 45, *a*), the "body-spicule" (fig. 45, *c*), and the two forms of "anchoring-spicule" (fig. 45, *d*). Body-substance composed of the "body-spicules" alone, held together by areolar sarcode charged more or less with flesh-spicules, and traversed by the branches of the excretory canal-system. Excretory canal-system most developed towards the circumference, least towards the centre of the body-substance, where the spicules are most densely aggregated and the structure most compact, whence the subnucleated appearance. Skeleton-spicules of three forms, viz.:—1, the zone-spicule, composed of a long, stout, straight shaft, smooth, round, sharp-pointed, and directed internally, supporting a head consisting of three arms, furcated, expanded horizontally, and a little recurved, supporting the petrous crust externally, shaft 170- by 8-1800ths inch, total expansion of the arms 54-1800ths inch in diameter (fig. 45, *a*); 2, body- or staple spicule, acerate, stout, more or less curved, smooth, round, attenuatingly pointed, mixed with the zone-spicules, where it often pierces the crust, and forming, with the exception of the siliceous balls in all stages of development and the body-stellates exclusively, the skeleton-spicule of the body-substance, 190- by 5-1800ths inch (fig. 45, *c*); 3, anchoring-spicule, composed of a long, delicate, straight shaft, smooth, round, sharp-pointed, and directed internally, supporting a small head with usually three delicate arms recurved like the flukes of an anchor, or extended like the prong of a fork (fig. 45, *d*), associated with the zone-spicules, but often piercing the petrous crust so as to form anchoring-spicules externally, which are for the most part broken off, shaft very long and thin, variable in length, arms about 9-1800ths inch long. Flesh-spicules of four forms, viz.:—1, the nodastrellum, globular, the rays being represented by minute round tubercles about 2-6000ths inch in diameter, hence its name, most abundant in the dermal reticulation (fig. 45, *g*, *h*): 2, dermal, acerate, slightly curved, smooth, round, attenuatingly pointed, supporting the dermal reticulation over the petrous crust, about 22- by $\frac{1}{2}$ -1800th inch (fig. 45, *h*): 3, siliceous ball, spheroidal or elliptical (fig. 45, *f*), slightly compressed, presenting, when fully developed, a tessellated stelliferous surface, and a hilum-like depression on the

flattened sides respectively, composed of radiating, columnar structure internally, each pillar ending on the surface in a little stelliform head, which, in juxtaposition, produces the tessellated appearance mentioned; the siliceous balls at maturity form the crust, and are scattered throughout the sarcode of the outer part of the body-substance and zone, as before stated, in all stages of growth, where their gradationary development may be easily observed; largest or adult size about 7-1800ths inch in diameter: 4, body-stellate, consisting of a starlike spicule with conical pointed rays, united together in the centre *without* a nucleus or body (fig. 45, e, i), sparsely scattered through the body-substance, about 3-6000ths inch in diameter. Size of largest specimens, which are tuberous, 4 inches in diameter; size of smallest specimens, which are spheroidal, 4-12ths inch in diameter.

Hab. Marine, free or attached to solid bodies.

Loc. In the deep water between the north of Scotland, the north-west of Shetland, and the Färöe Islands, at stations 51, 57, 61-63, and 65 respectively; also near Cape St. Vincent.

Obs. It is difficult to find a satisfactory distinguishing character among most of the *Geodina*, as they are so much alike in all parts of the world. In the above instance this is chiefly to be found in the nodose form of the surface-spicule or stellate, and hence the designation "*nodastrella*;" while the furcate division of the arms of the zone-spicule appears to offer (for the specimens dredged up on board the 'Porcupine' at least) a convenient character for separation, if not also for recognizing the *embryonic form of the ovum*, as will presently be seen.

It was at the base of a specimen of one of these *Geodina*, about 2 inches in diameter, that I found two projecting spicules bearing respectively a globular embryonic form, which, from its size, appears to be the first stage after the elimination of the ovum of this species. These I mounted in balsam together, on the spicules bearing them respectively as I found them. One, the largest, is 14-, and the other 9-1800ths inch in diameter. They are both composed of furcate zone-spicules, which have the furcated arms of their heads incurvated over the convexity of the embryo, while their shafts are directed towards the centre; in both, too, the sarcode is sparsely charged with minute stellates, from some of which the siliceous balls might subsequently have become developed, as the latter originate in this way, while when fully developed the siliceous ball is nearly as large as the whole embryo itself. Besides these spicules, the smaller specimen possesses the acerate body-spicule, which projects a little beyond the surface; and one or

two of these linear projecting shafts having been broken off leads me to infer that these might have been anchoring-spicules which had lost their heads, as the latter are not to be seen on either embryo. The whole of the embryo and its spicules are, of course, of microscopic minuteness, as they can only be seen with $\frac{1}{4}$ -inch compound power, equal to nearly 400 diameters, although quite as clearly as if the spicules had been of the largest size.

I have been thus particular in describing these embryos taken from the base of a *Geodia* and corresponding in the form of their spicules with those of that *Geodia*, because the name of "ovarium" has been applied to the "siliceous balls" of the petrous crust by Dr. Bowerbank, and that of "ovisacs" by the late Dr. Gray in his "Notes on the Arrangement of Sponges" (P. Z. S. 9th May, 1867), while many others have adopted a similar terminology; so that, had not Dr. Johnston (Brit. Spong. 1842, p. 202), Schmidt, and those who have particularly examined these bodies from their earliest appearance to their full development, which every specimen of *Geodia* presents in abundance, been perfectly satisfied that they could not be considered reproductive elements of the *Geodia* under any form, these two embryos would prove that the "siliceous balls" are nothing more than sponge-spicules of this particular form; besides, they have just the appearance and general character of the embryos of *Tethya cranium*, which I described and illustrated in 1872 (Ann. & Mag. Nat. Hist. vol. ix. p. 426, pl. xxii.).

The description of *Geodia nodastrella* above given may appear prolix; but it is the first time that I have had the opportunity of giving a *typical* one; and the species are so much alike that this in its general characters may serve for all the rest.

Geodia megastrella, n. sp. (Pl. XVI. figs. 46 and 46'.)

General form hemispheroidal, elongate, flattened at the base, where it is adherent to the surface of the large fragment of *Corallistes Bowerbankii* on which it has grown, presenting a large circular aperture on the summit. Colour now grey. Surface, where not rubbed off, the same as in the foregoing species; but the stellate of the dermis (fig. 46', *h, m*) furnished with minutely spined capitate rays instead of simple nodes, and the siliceous ball very large, being 13-1800ths inch in diameter (fig. 46', *g*). Pores as in the last species (fig. 46, *c*). Vent single, on the summit, consisting of a large circular hole partly closed by a diaphragm of sarcoderm (fig. 46, *d*). Internal

structure the same as in the foregoing species; but the zone-spicule and the stellate with which the internal sarcode is charged are different. Thus the zone-spicule consists of a long, smooth, round, straight shaft, pointed internally and terminated externally by three simple, or unfurcated arms, which are applied to the inner side of the petrous crust of siliceous balls (fig. 46', *a*). Arms smooth, round, sharp-pointed, expanded laterally and anteriorly, and slightly recurved; shaft about 200- by 5-1800ths inch, arm about 47- by 5-1800ths inch. Body-spicule about 210- by 3-1800ths inch (fig. 46', *c*). Anchoring-spicules much the same as in the last species (fig. 46', *d*). Sometimes, too, the arms of the zone-spicule are furcated (fig. 46', *b*). Flesh-spicules of the sarcode internally stelliform, of two sizes, viz.:—1, the largest (megastrellum), very large and plentiful, consisting of 3-7 arms radiating irregularly from the centre, which has *no body* or nucleus; arm round, straight, sharp-pointed and microspined throughout; total diameter of the megastrellum 6-1800ths inch, arm 3-1800ths inch long (fig. 46', *e, k*): 2, small body-stellate, the same as the foregoing, but only 3-6000ths inch in diameter (fig. 46', *f, l*). The seven-armed form appears to be most common in both the megastrellum and the body-stellate. Size of specimen (fig. 46) 1 by $1\frac{1}{4}$ inch long at the base and $\frac{3}{4}$ inch high; longer than broad.

Hab. Marine, on hard bodies.

Loc. Probably from station 25=374 fathoms, near Cape St. Vincent, where the fragments of *Corallistes Bowerbankii* in the jar bearing these numbers were dredged up; for the specimen is dry and has no label.

Obs. There is only one specimen of this *Geodia*; and, as just stated, it is dry and has grown on the flat surface of a large fragment of *Corallistes Bowerbankii*.

Geodia megastrella, var. *levispina*.

(Pl. XVI. fig. 47 &c.)

Of this form there is only a fragment of the crust or capping about an inch square, to which a little of the internal structure is still adherent. It was dredged in 292 fathoms, at station 24, which would be a few miles north of Cape St. Vincent, in the 1870 cruise, and agrees with the last species in the form of the zone- and body-spicules and the presence of the large stellate (megastrellum), but not in the surface stellate, the rays of which are simply truncated (fig. 47, *f, k*), and the siliceous ball about 11-1800ths inch in diameter (fig. 47, *e*). The zone-spicule (fig. 47, *a*), too, is much smaller; for the shaft

is only 87- by 3-1800ths inch long, and the arms 29-1800ths inch long respectively. Here also there is a tendency to bifurcation in the latter; while the large stellate (megastrellum) of the interior, although of the same size as that of the foregoing species, has for the most part only six arms, and these are smooth, not microspined (fig. 47, *d, h*), as in the foregoing species.

Hab. Marine.

Loc. Above mentioned.

Obs. With only a fragment of the capping or petrous crust of this form, this is all that can be stated descriptively about its spicules; and the general form of the entire sponge of course is absent altogether.

The specimen, however, is very interesting in a developmental point of view; for its spicules being in many instances abnormal in form, especially the siliceous ball, shows how intimately the latter is connected with a stellate, and how, in all probability in its minutest form, it always originates in one. Thus the siliceous ball, even when of full size, often presents itself here in the form of a thick coarse stellate, with from five to seven arms, each of which may present more or less of the little stellate terminations which, in juxtaposition, make up the tessellated surface of the matured and normally developed ball, showing plainly that the latter belongs to the stellate group of spicules.

We see a similar development of the siliceous ball in Dr. Bowerbank's illustrations of *Geodia tuberosa* (Proc. Zool. Soc. 1872, pl. 46. fig. 11) and especially in the abnormal developments given by Schmidt (Spong. Küste Algier, 1868, Taf. iv. fig. 6) on the left side of the illustrations of *Stelletta intermedia*, where, as *Stelletta* has no siliceous balls, it is evidently the abnormal development of the stellate itself, which closely approaches that of the abnormally developed siliceous ball in *Geodia megastrella*, var. *levispina*.

The fact, too, that the siliceous ball belongs to and probably originates in a stellate form, bears upon the nature of the stellates present in the embryos of *Geodia megastrella*, which altogether are respectively hardly larger than the full-sized siliceous balls of this species, and therefore can only present these balls in a rudimentary state—that is, in the stellate form.

In the three species of *Geodia* above described, the fluked anchoring-spicule somewhat differs in the form of its head, as may be seen in the illustrations; but this has not been insisted on in the descriptions, because the form often differs so much even in the same species.

Stelletta pachastrelloides, n. sp. (Pl. XV. fig. 40, &c.)

General form large, flat, thick, irregularly undulated, amorphous, composed of a confused mass of spicules; margin thick, round, and also irregularly undulous, except where it appears to have been broken off from the submarine object to which the sponge had been attached. Colour cream-yellow. Upper and under surfaces so much alike as to be almost undistinguishable, the former undulating, even, asperous from projection of the ends of the large spicules, which are more or less confusedly and horizontally imbedded in the dermal sarcode; the latter similar, but more granular, and sometimes indicated by the impressions of small pebbles on which the sponge may have rested while growing; the whole more or less enveloping small objects such as minute Foraminifera (*Globigerina*), small shells, &c., also overgrown by a variety of other sponges. Pores chiefly in the dermal sarcode, tympanizing the interstices between the projecting spicules. Vents single or in groups, more or less irregularly scattered over both surfaces, especially the lower one. Internal structure more compact, consisting also of a confused mass of spicules held together by cancellated sarcode, traversed by the branched canals of the excretory system, which chiefly run towards the lower surface, where they end in the vents mentioned. Spicules of two kinds, viz. skeleton- and flesh-spicules. Skeleton-spicules of three forms, viz.:—1, zone-spicule, comparatively small, consisting of a three-armed shaft, arms equal, equidistant, simple, smooth, sharp-pointed, expanded almost horizontally and slightly recurved; shaft about twice the length of the arm, straight, smooth, sharp-pointed, 60- by 5-1800ths inch, arm 35- by 4-1800ths inch (Pl. XV. fig. 40, *b*); 2, body-spicule, *very large* simple acerate, slightly curved, and sharp-pointed, 260- by 7-1800ths inch (fig. 40, *a*); 3, anchoring-spicule, a three-armed shaft, arms equal, equidistant, simple, smooth, sharp-pointed, at first expanded for a short distance, and then suddenly bent backward; shaft thin and very long, smooth, straight, sharp-pointed, 260- by $1\frac{1}{2}$ -1800th inch long, arms 12- by $1\frac{1}{2}$ -1800th long (fig. 40, *c*, *h*). The forked form not observed. Flesh-spicules of four forms, viz.:—1, long, simple, acerate, slightly curved and thickly microspined, 58- by $1\frac{1}{2}$ -6000th inch, but very variable in size (fig. 40, *d*, *i*); 2, short, simple, acerate, curved or bent in the centre, with or without central inflation, pointed or obtuse at the extremities, thickly microspined, 11- by 2-6000ths inch (fig. 40, *e*); 3, globular stellate, of 6 or 7 rays, rays unequal, microspined at the extremities,

4-6000ths inch in total diameter (fig. 40, *f*); 4, elongated stellate, axis bacilliform, twisted and spined, spines or rays linear, 3-6000ths inch long (fig. 40, *g*). Zone-spicules chiefly confined to the surface, where they are disposed together confusedly, with their arms for the most part expanded over the surface and their shafts directed inwards. Body-spicule, which is the staple form and dominant size, confusedly spread throughout the mass, and where near the surface projecting through it so as to give a horribly asperous character. Anchoring-spicule much less numerous, imbedded in the general structure, or projecting with its head outwards and the shaft in the sponge. Flesh-spicule disposed in a mass among the foregoing, so as to fill up the interstices, where No. 2 is chiefly confined to the surface, the stellates being for the most part scanty. Size of specimens averages 5 inches broad by 1 inch thick.

Hab. Marine, frequently free, not fixed.

Loc. Atlantic Ocean, in 374 fathoms, at station 25, near Cape St. Vincent.

Obs. The fragments of this sponge, in their flat, amorphous forms, respectively resemble the broken ones of a thick, coarse, uneven earthenware dish with the edges rounded. Four are dry and without number; while the fifth is in a large jar accompanied by fragments of *Corallistes Bowerbankii*, *Macandrewia azorica*, and *Azorica Pfeifferæ*, *Geodia nodastrella*, *Phakellia ventilabrum*, *Hymenaphia verticillata*, *Histoderma phlyctenodes*, *Polytherses*, D. et M. (*Hircinia* permeated by the alga *Spongiophaga communis*), and small specimens of *Thalysius*, *Microciona*, and *Isodictya* respectively.

There is a great resemblance in general form between the fragments of this sponge and those of *Corallistes Bowerbankii* and *Pachastrella abyssi*, as if they all originally came from flat expanded masses, unless they grew out *Polyporus*-like by marginal attachment to some submarine rock, or were current-eroded about in a free state. Their confused structure of densely packed spicules, too, agrees with that of the *Pachastrellina* and *Lithistina*, together with the perpendicular direction to the flat surfaces of the short excretory canals, opening chiefly on one side; while the proportions of the zone-spicule approaching, in the length of its arms and shortness of the shaft, to that of the *Pachastrellina* causes this *Stelletta* very much to resemble the sponges of that group. On the other hand the large size of the body-spicule or acerate and the presence of the anchoring-spicule ally it to the *Stelletina*; hence the designation "*pachastrelloides*."

The anchoring-spicule when projecting externally has its head for the most part broken off, and therefore is only found

perfect in depressions where it has been protected from contact with external objects.

From the variety and number of foreign objects imbedded in the dermal sarcode, it would appear as if the fragments of this sponge had been currented about over the deep-sea bottom while they were still growing, thus adding to their structure—or, in a fixed position, had grown in the midst of deep-sea detritus, thus with their horrible roughness closely resembling the fragments of *Pachastrella abyssi* with which they are associated: they are very disagreeable to handle, and very dangerous, from the coarseness of their spicules, to the object-glasses of a microscope.

Tethya cranium, var. *abyssorum*. (Pl. XVI. fig. 49.)

With reference to this variety, which abounds among the dredgings of the 'Porcupine,' chiefly from the deep sea separating the north of Scotland from the Färöe Islands, I can see so little difference between it and that of *T. cranium* of more shallow water, viz. from the Haaf banks off Shetland, that the special designation of this variety merely rests on the larger size of the flesh-spicules (bihamates), which, under $\frac{1}{4}$ -inch compound power (=about 400 diameters), are seen to be covered with minute vertical spines, while those of *T. cranium* in the British Museum are only half the size and the spines on the surface hardly visible. In the variety, the flesh-spicules are 4-6000ths inch long (Pl. XVI. fig. 49).

This seems to be equally prolific with the specimen of *T. cranium* figured in the 'Annals' (1872, vol. ix. pl. 22. fig. 13) to show its pregnancy with ova and embryos in various stages of development; for there is hardly a specimen among the sponges dredged up by the 'Porcupine' which has not one or more in various degrees of development adhering to it. (The same might be said, almost, of *Tisiphonia agariciformis*.) In their natural state, all the specimens of *T. cranium* are covered with the heads of the projecting anchoring-spicules; but while the forked forms frequently remain, the recurved or anchor-headed ones have their arms for the most part broken off. The bihamates, too, although scattered throughout the sarcode, are, as Dr. Bowerbank has observed, most plentifully congregated in the dermal layer.

Tethya cranium, var. *infrequens*. (Pl. XVI. fig. 48.)

Another variety of *T. cranium* was dredged up at station 57 in 632 fathoms; but as there is only one specimen of it, I am unable to state if it be a normal or a pathological develop-

ment. It differs from *T. cranium* in the following particulars, viz.:—the anchoring-spicule of both forms (fluke and fork) are much larger and stouter; in the fluked form (fig. 48, *c*) the arms are much more expanded and not so recurved as in *T. cranium*, while those of the forked form (fig. 48, *a*) are truncated towards their extremities, which respectively terminate in a cup-shaped excavation bordered by a serrated margin, while the central canal at the bottom of the cup-shaped cavity divides into a lash of branches, each of which goes to one of the tooth-like processes on the margin of the cup (fig. 48, *b*). Neither does the specimen, although in other respects exactly like *T. cranium*, contain any flesh-spicules (bihamates).

I have given the specimen a special designation; but I am very desirous not to introduce any thing into the description of a sponge which even borders upon an abnormal or pathological development of any part of it, as its natural varieties are quite sufficient to occupy our attention at one time. If their pathological ones are to be described, this should be done separately, and in an article exclusively devoted to the subject, as mixing the two must lead to inextricable confusion.

Pachastrella amygdaloides, n. sp. (Pl. XIV. fig. 22.)

General form almond-shaped, truncated at the apex, sessile. Colour yellowish white. Surface even, rough; structure of dermal sarcode confusedly spiculous in direct continuation with the interior, not corticate, charged with small, linear flesh-spicules filling up the interstices of the larger radiate or skeleton ones. Pores in the interstices among the small linear spicules, which are confusedly heaped together around them. Vents congregated in a circular depression at the truncated end (fig. 22, *c*). Internal structure composed of spicules equally confusedly held together by the internal sarcode, traversed by the excretory canal-system, which opens at the vents mentioned. Sarcode cancellous, of the same colour as the surface. Spicules of two kinds, viz. skeleton- and flesh-spicules. Skeleton-spicule of two forms, viz.:—1, large, tri-radiate, in which the fourth arm or shaft is only represented by a short extension of the central canal *inside* the spicule, or subquadrate, in which this is only extended into a short round elevation or knob (fig. 22, *g g*), arms round, smooth, sharp-pointed, and somewhat curved, 50- by 4-1800ths inch; 2, long, acerate, fusiform, smooth, sharp-pointed, 117- by 1-1800th inch (fig. 22, *h*). Flesh-spicules of three forms, viz.:—1, acerate, fusiform, sharp-pointed, slightly curved, micro-spined, varying in size from 6- to 30-6000ths inch long (fig.

22, *i*); 2, the same but smaller, and for the most part centrally inflated (fig. 22, *k*), probably passing, when more developed, into the former; 3, stelliform, irregularly rayed, or with elongated axis and rays chiefly developed at the ends bistellate-like, rays linear (fig. 22, *ll*). The large triradiate and subquadriradiates, together with the acerate skeleton-spicules which are very long, are confusedly arranged together throughout the sponge, lying perhaps most horizontally on the surface, while the flesh-spicules, imbedded in the sarcode, make up the rest of the mass, the larger microspined flesh-spicules being chiefly confined to the interior, and the smaller ones to the surface, while the stellates are dispersed generally and very subordinate in number. Size of specimen about 1 inch long, 7-12ths inch broad, and 5-12ths inch in its vertical diameter.

Hab. Marine, on hard bodies.

Loc. Atlantic Ocean, at station 24=292 fathoms, near Cape St. Vincent.

Obs. There is only one specimen of this sponge, which is contained in a jar labelled "24, 292 fathoms," which station will be found on the chart accompanying the report of the cruise of the 'Porcupine' in 1870 (Roy. Soc. Proc. no. 125). It is accompanied by small specimens of several other sponges, viz. *Histoderma appendiculatum*, *Hymedesmia Johnstoni*, *Geodia*, *Tisiphonia*, *Tethya cranium*, *Pachastrella abyssii*, and a histodermal form of *Halichondria panicea*, together with several rolled pieces of agglomerated spicules of various sponges.

There is a great resemblance between the spicules of this sponge and those of Schmidt's *Sphinctrella horrida*, Atlant. Spongienf. p. 65, Taf. vi. figs. 6 & 7 (that is, rather, to the spicules in the slide of this sponge belonging to the British Museum), but it differs much from Schmidt's illustration fig. 7, in which there are distinct sphinctral areas of the dermal sarcode charged with stellates, while the larger linear skeleton-spicules are obtusely pointed—which is quite opposite to the above description of *Pachastrella amygdaloïdes*, taken, too, from a specimen unusually perfect.

Pachastrella geodioides, n. sp. (Pl. XIV. fig. 23 &c.)

General form globular, a little wider at the base than at the summit, sessile. Colour dark grey. Surface even, uniform, slightly roughened by projecting spicules; dermal sarcode charged confusedly with the spicules of the species mixed with minute foreign organisms of various kinds, directly continuous with the internal structure that is *not* corticate. Pores in the dermal structure, more or less indistinct. Vents small, scat-

tered singly here and there. Internal structure compact, consisting of cancellated sarcode confusedly charged with the spicules of the species, together with minute foreign objects like those of the dermal layer, traversed by the excretory canal-system, which opens at the vents mentioned. Colour of sarcode dark grey. Spicules of two kinds, viz. skeleton- and flesh-spicules. Skeleton-spicules of three forms, like those of *P. amygdaloides*, viz.:—1, large triradiate, in which the fourth arm or shaft is only represented by a short extension of the central canal inside the spicule, or subquadriradiate, in which this is extended into a short round prominence more or less prolonged, arms of equal length, smooth, round, sharp-pointed, somewhat curved, 50- by 6-1800ths inch (fig. 23, *i, b*); 2, similar to the foregoing, but much smaller, with the fourth ray or shaft produced or not, and the three arms bifurcated or not at the extremities (fig. 23, *k k k*); 3, linear, acerate, fusiform, smooth, sharp-pointed, and slightly curved, much smaller and more subordinate in this respect than the linear spicule of *P. amygdaloides*, 53- by $\frac{3}{8}$ -1800th inch (fig. 23, *l*). Flesh-spicule of one form only, viz. globostellate, with the rays reduced to short round tubercles, mulberry- or blackberry-like (fig. 23, *m, o, p*), often presenting a distinct stellate in the centre, whose rays respectively end in the short round tubercles of the surface (fig. 23, *m, n*), 6-6000ths inch in diameter. Although the average largest size of the spicules respectively is easily obtained, there is a great variety in this as well as in the forms of all, and they are all confusedly massed together, mixed up with the flesh-spicules in great abundance as well as with the minute foreign objects, especially consisting in this instance of the siliceous balls of *Geodia*: perhaps the arms of the large radiates lie flatter on the surface than anywhere else, where they are partially hidden by the flesh-spicules among which they are imbedded, and thus present a tessellated surface; but there is no *cortex*, as before stated, and the dermal surface is but the limit externally of the internal or general structure and composition of the sponge. Size of specimen about 1 inch high by 1 inch in diameter at the bottom.

Hab. Marine, attached to hard objects.

Loc. Atlantic Ocean, in company with *P. amygdaloides*, near Cape St. Vincent.

Obs. There is but one specimen of this sponge; and it is contained in the jar with *P. amygdaloides*, under which the number of the station &c. is mentioned. Although much like *P. amygdaloides* as regards the presence of the large triradiate and subquadriradiate skeleton-spicules, there is abundant evidence in other respects for separation, as may be seen by the descriptions of these two species of *Pachastrella* respectively.

While the globular form and compact structure generally, if not the great abundance of the little globostellate flesh-spicules, liken this sponge to *Geodia*, the great abundance also of triradiate and subquadriradiate spicules mixed together confusedly (that is, without apparent order) also recalls to mind the structure and spicules of the *Calcarea*, while the absence of cortex and its massive nature ally it most to the group *Lithistina* among the *Pachastrellida*.

Of course, where there is only one specimen of a sponge to describe from, as in this instance, a wide margin must be given to differences of general form which may be found to occur after a large number have been examined; but this does not affect the composition.

The form of the acerate skeleton-spicule being the same in *P. amygdaloides* and *P. geodioides*, only one illustration (Pl. XIV. figs. 22 & 23, *h*, *l*, respectively) is given for both; but it should be remembered that this spicule is three times as large in the former as in the latter, where it also varies greatly in size.

. *Pachastrella intexta*, n. sp. (Pl. XV. fig. 41.)

Indicated by the presence of a circumscribed light discoloration in an old brown, dead, thick, flat fragment of *Corallistes Bowerbankii*, dredged up in 374 fathoms at station 25, a few miles north of Cape St. Vincent.

Although the specimen of this sponge is insignificant in extent, having been discovered almost by accident while examining microscopically different-coloured patches on the fragment of *Corallistes* mentioned, its spicules furnish a new species of *Pachastrella*, consisting, like all the rest, of two kinds, viz. skeleton- and flesh-spicules. Skeleton-spicules of two forms, viz.:—1, linear and branched; linear spicule long, acerate, curved, smooth and sharp-pointed, which having only been observed in a fragmentary state from the portion of *Corallistes* among whose spicules the sponge has grown, having to be dug out with the point of a penknife for examination, its measurements have not been ascertained: 2, ramular or radiate skeleton-spicule, consisting of a straight smooth shaft, pointed at both ends, from the centre of which, or thereabouts, branch off three arms at equal distances from each other, which become bifurcated and often trifurcated (Pl. XV. fig. 41); arms 4-6000ths inch in *total* diameter, slightly inclined forwards; viewing the fifth ray as an anterior prolongation of the shaft, which is altogether subsidiary in size to the rest, the arms and their branches are the most striking part. Flesh-spicules of two forms, viz.:—1, bacillary, slightly undulate, presenting

throughout its course a number of short blunt spines of different lengths, chiefly radiating from the ends, and more or less congregated at two points on the body of the shaft (fig. 41 *a*), 5-6000ths inch long; 2, minute, also bacillary in the shaft, which is more or less twisted, and presents a number of fine, thin, long, linear spines, chiefly congregated about the ends, so as to assume a bistellate appearance, $2\frac{1}{2}$ -6000ths inch long (fig. 41, *b*).

Pachastrella parasitica, n. sp. (Pl. XVI. fig. 50 &c.)

Like the foregoing, but not belonging to the sponges dredged up on board the 'Porcupine,' is a *Pachastrella* which I have lately found on a specimen of *Polytremia utricularis* ('Annals,' 1876, vol. xvii. p. 211, pl. xiii. fig. 17, *a*, *b*), and have therefore designated "*parasitica*." Locality unknown. The linear, acerate (Pl. XVI. fig. 50, *c*), and ramular skeleton (fig. 50, *a*), with the bacillary spinous (fig. 50, *d*) and minute stellate (fig. 50, *f*) flesh-spicules are, *mutatis mutandis*, the same. Here, however, the branches of the ramular skeleton-spicule are *thrice* divided, not "twice" only, as erroneously figured and stated in the 'Annals' (*l. c.*), where also the shaft should have been prolonged anteriorly. The large bacillary spined flesh-spicule, too, is thin, slightly undulating and thickly beset with minute spines like that of *Pachastrella abyssi*; but we have not the distinguishing character of the latter here, viz. the thick, solid, *skittle-shaped* flesh-spicule.

Had not my attention, at the time I alluded to this species in the 'Annals,' been chiefly taken up in examining the organism on which it is parasitic, I should not have made the mistakes in delineation &c. to which I have above referred; while now that it is specially called to the sponges, I have the opportunity of correcting them.

All the species of *Pachastrella*, beginning with *Dercitus niger* of our coasts, are amorphous, and are in the habit of penetrating any crevices over which they may be growing; so that they are often found in the midst of the branches of old corals and deciduous shells, in company with a boring *Cliona*, which they follow but *do not precede*. Again, they do not reject hard objects with which they may come into contact during growth, especially *P. abyssi*, which appears to incorporate every thing of the kind it meets with, in which these sponges very much resemble fungi.

With the shaft being often prolonged beyond the giving-off of the branches in *P. parasitica*, together with the twisted and divided form of the distal bifurcations, we have a ramular form which seems to lead into the still more complicate one of the Lithistina.

[To be continued].